May 1988 Naval Aviation Safety Review US NAVY

approach

approach looks at inflight refueling

"I consider this possible as a stunt, but as a service routine job, distinctly improbable."
— RAF test pilot after an aerial refueling experiment

Tanker Tales

Tales of Aerial Refueling Through the Years

Special thanks to Phil Edwards of the National Air and Space Museum for his generous help in researching the early years of aerial refueling.

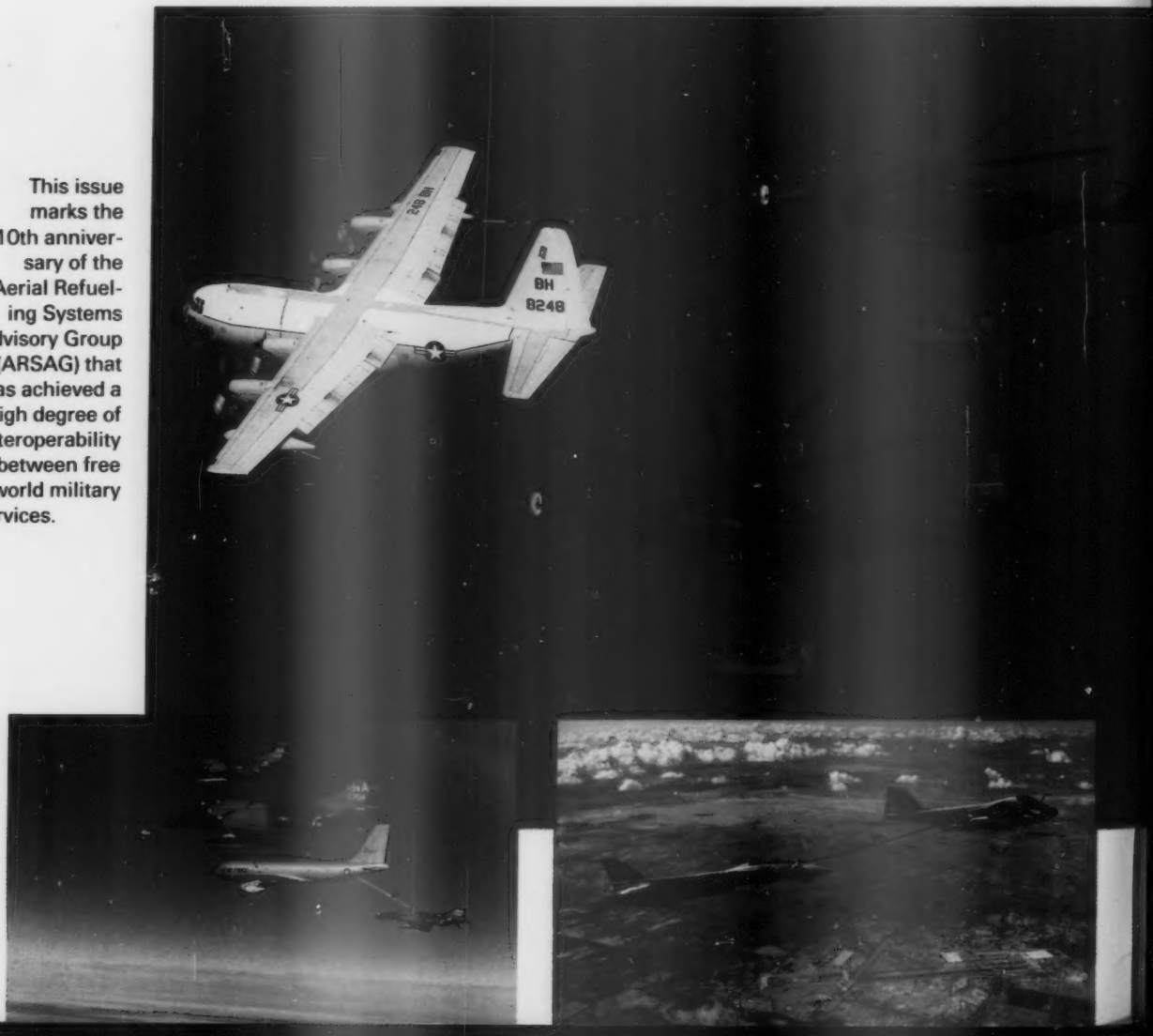
USAF

Army Air Service DH-4Bs during the first aerial refueling.

THE U.S. Navy's interest in aerial refueling dates from the latter days of World War I. In 1918, Lt. Godfrey Cabot proposed aerial refueling as an expedient way to deliver multi-engined bombers to Europe. His idea was to position ships along the intended route with a special apparatus from which the bomber could snatch fuel while airborne. The aircraft would trail a weighted line that would be snared by a V-shaped guide with an attachment device at the throat. As the line passed through, a fuel load or other payload could be attached, which the aircraft would then

Continued overleaf

This issue marks the 10th anniversary of the Aerial Refueling Systems Advisory Group (ARSAG) that has achieved a high degree of interoperability between free world military services.



"What?"

These bars have no

HAPPY HOUR.

Don't drink and drive.

Poster idea contributed by AE2 Jedd Figg, VS-37

D3-
Naval
NAS N

If you don't protect your hearing now,
this may be the way you will deal with
future hearing problems.

D4-GS-488
Naval Safety Center
NAS Norfolk, VA

inside approach

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May 88 cover credits
Front: Lt. Mike Silva, VF-142
Back
Top: VFP-206
Middle left: McDonnell Douglas via Dwight Timm
Middle right: MoD, via Gordon Swanborough
Bottom: Lt. Mike Silva, VF-142
Inside
Top: USAF
Middle: Sikorsky
Bottom right: LCdr. Dave Parsons
Bottom left: Maj. Mike Steadman, USAF

FEATURES

DEPARTMENTS

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Continued from inside front cover

winch aboard. Cabot was given the go-ahead to experiment in 1918; by 1920, he had successfully picked up both payloads and fuel in a Burgess-Dunne seaplane. Unfortunately, the war had ended by then and official interest had diminished.

Meanwhile, the visionary Gen. Billy Mitchell had embarked the Army Air Service on an ambitious program to extend the limits of aviation technology. He enlisted the aid of pioneer Lawrence Sperry, who had already done work on the first autopilot. As part of project Zodiac, Sperry began research and development on methods of "safe and useful midair contact." Zodiac laid the groundwork for the first practical demonstration of air-to-air refueling. In June of 1923, Capt. Lowell Smith and Lt. John Richter, flying a DH-4B, successfully received fuel from another DH-4B modified as a tanker. The tanker trailed a 50-foot hose attached to a steel cable. Smith and Richter maneuvered into position to grab it by hand and guide it into the fuel tank. In August they took to the air for more than 37 hours. This feat required 15 refuelings. Although they stayed in the general vicinity of their home field of Rockwell near San Diego, Calif., they flew the equivalent of 3,293 miles.

It was a phenomenal achievement and caught the notice of aviators worldwide. It also spurred further research in the realm of aerial refueling. A Belgian team set a new record of 60 hours soon after, and other countries such as Britain and France began experimenting as well.

The world again took notice in 1929 as the "Question Mark" (an Army Air Service Fokker C2-3 transport) stayed aloft for nearly a week in January, making 43 aerial contacts and receiving more than 80,000 pounds of fuel and other materials. The record was rapidly and repeatedly broken: by Jackson and O'Brine in July (16 days), at the 1930 National Air Races in Chicago by two brothers named Hunter (23 days), and by the "Greater St. Louis" (nearly 27 days). Finally, the Key brothers in "Ole Miss" set the modern record with nearly a month in the air. *(See box on "Ole Miss")*


Congratulations and best wishes, Key Brothers - We are justly proud of you!

THE MERIDIAN STAR

KEYS BREAK AIR ENDURANCE RECORD;
OLE MISS CONTINUES GOING STRONG

PAIR AIMS AT

Keys Who Unlocked World's Doors

MERIDIAN TENSE AT "ZERO HOUR"

"Ole Miss"

Capt. Tom Cavanaugh, USMC

THE flight departed what is now Key Field in Meridian, Mississippi at just after noon on June 4, 1935. After nearly a month in the air the Key brothers returned to earth on July 1, 1935, breaking all previous records and astounding the world. Support was provided by another Curtiss Robin, which made 113 sorties and 484 transfers of fuel and other supplies. This achievement in sustained powered flight has only been exceeded by some of the space flight missions more than 30 years later.

In order to remain aloft for such a long time, the brothers had to incorporate the ability to service the engine. They built a metal scaffold on the exterior of the forward end of the fuselage to allow one of the occupants to climb out of the cabin and work on the engine. During routine servicing it was necessary to remove the access covers to lubricate the engine rocker arms. On one occasion the slipstream carried away the cover. The support team had to fabricate another cover and transfer it to "Ole Miss."

A safety harness was used when one of the brothers was outside the aircraft, but on one trip outside the cabin, Fred Key lost his handhold and his restraining harness when he was hit by an unexpected gust of wind. Only his feet kept him from a 3000-foot freefall and certain death. The only other close call was when an electrical fire filled the cabin with smoke and forced Al Key to secure the engine while Fred fought the fire with a portable extinguisher. The brothers ended the flight after 653 hours and 34 minutes in the air. Although they were shooting for an entire month airborne, they found a bolt in the tail section that was in the process of slowly backing out due to the prolonged effect of vibration. Unable to reach the bolt to secure it, they decided to end their flight 3 days short of their goal. Upon landing, the brothers were hailed as heroes by the townspeople, who renamed the airfield in their honor.

Capt. Cavanaugh is an instructor with Training Air Wing One, NAS Meridian, Miss.

The flight of "Ole Miss" introduced the use of the automatic nozzle cutoff that formed the basis for transition to more sophisticated designs that would make aerial refueling a practical operation and not confine it to the world of stunt or experimental flying. It wasn't until the '50s that a truly practical method emerged that was adopted for Navy use. That was, of course, probe and drogue refueling, which is another story.

Tanker Tales

TRANSPAC Divert

By LCdr. Pat LeBlanc

AERIAL refueling and crossing large bodies of water have become routine. However, there are emergencies that can put you in extremis rapidly. Three hours into the first leg of a seven-hour TRANSPAC, LCdr. Doug Hall and LCdr. Ken Ginader, flying in an F-14, found out how non-routine a TRANSPAC could become. Rendezvousing on their Air Force tanker for some scheduled refueling, LCdr. Hall detected a sudden decrease in RPM on his starboard engine. As he started the requisite bold face procedures, LCdr. Ginader backed him up with the PCL and kept the rest of the flight informed about their situation. They repeatedly tried to relight the engine, but it did not respond. There was an internal malfunction in the throttle electromechanical actuator.

They were now single-engine more than 100 miles from the nearest land. Their planned divert of Anchorage, Alaska had been VMC less than 30 minutes before, but was now reporting 400 overcast and one mile visibility with rain showers. They opted to proceed to Eielson AFB near Fairbanks, which was VMC but more than 400 miles away. They completed their bingo profile and made an uneventful landing at Eielson AFB.

The northern Pacific is a region where sudden changes in weather are common. This F-14 crew made a wise decision and steered away from weather that could have made their situation untenable. The smallest mistake could have led to ejection into a very inhospitable environment.

Aerial refueling can be routine, but it's not so routine that you can let down your guard on preflight planning; you should plan diverts all along the way. ◄

LCdr. LeBlanc is the ASO for VF-24.

Deep, Dark Trouble

By Gene Chancy

RETURNING from a night CAP, I called the ball with slightly less than 2,100 pounds of fuel. My approach was normal until I got in close, at which time the ball went high and I boltered. CCA turned me downwind, and I commenced my second approach with 1,900 pounds. On the second pass, I got a foul deck wave-off and again turned downwind. The third pass resulted in a bolter, and I turned downwind without the help of CCA radar, which was down.

The airborne tanker was contacted and told to descend to 1,000 feet, and stand by. The tanker pilot asked for a vector to me, and I replied I was turning off the 180 for another approach. The fourth pass resulted in another bolter, and I began a downwind turn with about 1,400 pounds. CCA told me to steady up and hold my heading of 320. Then, they told the tanker pilot to join me as we headed in a northwesterly direction.

I cleaned up, climbed to 5,000 feet and set max endurance airspeed. The tanker pilot called six miles astern. After my second bolter, I had asked the LSO if my hook had skipped, but he didn't reply. I thought I was probably going to be sent to Da Nang rather than try to trap aboard.

I made a left turn and the A-4 tanker joined on me. I gave the lead to the tanker, and after extending my IFR (In-flight Refueling) probe, I attempted a plug. We were at 5,000 feet, 210 knots, and the basket was moving around considerably. I told the tanker to increase speed to about 240 knots after which I successfully engaged the basket. After I pushed the basket hose up into the centerline refueling store, the green-receiving-fuel light came on for about 10 seconds, then went out. I checked my fuel gauges, which read 800 pounds at the main and 0 at the transfer. I told the A-4 the light was off, and he replied he could only transfer occasionally by manually hitting a cockpit switch. The green light flickered twice, and the tanker pilot said he could not give me any more fuel. I backed out, retracted by probe and started an idle descent. My gauges read 700 and 0.

After I leveled at 1,000 feet, 250 knots, the ship advised that it would be 2-3 minutes before the barricade was rigged. I asked whether the barricade would be ready if I turned in-bound to make an approach; after a delay, the ship said it would. I turned inbound to the ship at eight miles. My fuel gauges had not changed for several minutes, and since the gauges were reportedly inaccurate around the 500-pound mark, and since the pointers had been steady for several minutes, I was uncertain of my exact fuel state.

At this point, I suspected I would have to eject if my first pass was unsuccessful. I picked up the meatball and started down. About one-third of the way down the glide slope, the LSO asked Primary for a clear deck. When he got no answer, he waved me off. Executing the wave-off, I immediately rolled into a 45-degree left turn at 250-300 feet and checked my gauges. They had not changed, and the night was very dark.

I had my radio altimeter on and continually cross-checked it with my pressure altimeter. I knew my pattern would be short resulting in a short groove and that I could not be high on the next approach. Therefore, I maintained 300 feet all the way around, into the groove. I called the ball, made my approach, caught the number 2 wire and engaged the barricade.

Mr. Chancy flew F-8s with VF-211 in Vietnam, and shot down a MiG-17 in June 1966. He is now a chief pilot with Continental Airlines.

My fuel gauges were reportedly inaccurate around the 500-pound mark, and since the pointers had been steady for several minutes, I was uncertain of my exact fuel state.

Israeli Aerial

By Peter Mersky

Israeli 707 refuels an IAF F-4E Phantom.

TV picture of F-4 approaching the 707's boom.

Receiver's view of the 707 boom.

ALTHOUGH it does not have the large number of tanker assets the U.S. enjoys, Israel has developed an impressive aerial refueling capability over the last 20 years. At first, the Israeli Air Force (IAF) used Boeing KC-97s, large four-engine transports converted to the mission in the late 1950s. KC-97s were very important during the 1969-70 War of Attrition, and were used to refuel the IAF's RF-4Es. The Boeings were used also extensively in the 1973 Yom Kippur War, and then retired. They could only refuel A-4s and F-4s, which formed the main tactical force for the IAF at that time, but the KC-97s could not refuel helicopters because they could not match the helos' slower speeds.

Following the KC-97s' retirement, the IAF introduced Boeing 707s which they bought directly from the manufacturer. Israel failed to get permission to buy dedicated KC-135 tankers, and refurbished the old 707s with a unique refueling system using television. Instead of the familiar "boomer" station in the tail, such as the KC-135s in service with the USAF, the IAF's 707s included a *seated* station in the plane's cargo area.

The boom operator now monitors the approach and refueling by remote cameras with

l Refueling

displays on large screens. He uses a joy stick to "fly" the boom. Night operations use externally mounted lights on the tanker to illuminate the boom and receiver aircraft.

The 707s gave a tremendous boost to the IAF's capabilities and made several long-range operations possible. The 707s can refuel F-4s, as well as F-15s and F-16s.

The IAF uses KC-130s with the basket system used by U.S. Marine Corps tankers to refuel A-4s and F-4s. The IAF's Herks can also refuel the IAF's CH-53D helicopters. A-4s are also used by the IAF with buddy stores similiar to those used by the KC-130s. ◄

Top: Boeing 707 refuels an IAF F-16.

Middle: An IAF KC-130 refuels two F-4Es while two A-4s wait their turn.

Bottom: The 707 displays its Navy-type baskets used to refuel older types such as the A-4 and F-4.

Tanker Tales

I Learnt About Flying From That

Reprinted from the January 1988 issue of *Air Clues*

IT was a Friday afternoon, midwinter in the late '60s. We had retired to the squadron crew room for the traditional ground school session. In the corner of the room, the regular ticking of a metronome issuing forth from the telebrief was in earnest competition with the QFI's system lecture. Outside, one by one, 15 tons each of shining aluminium were disappearing into the hangar for the weekend break. Suddenly, a click stopped the metronome in midflow. A dozen pilots visibly jumped in their seats. Two seconds later, those famous (to Leuchars air crew) words rang out: "Leuchars, this is Buchan, alert one Lightning." Six pilots, still in flying kit, each briefly fought convincing arguments as to why each should be "Q One." In the meantime, as the correctly authorized "Q One" and more importantly, being the one nearest the door, I slipped outside, mounted the "Q One" bicycle and 45 seconds later, was climbing into the cockpit.

Within the allotted 10 minutes, I was airborne heading northeast without tanker support and in radio silence. Perhaps today I would catch that elusive Bear off guard and add to my fast growing number of intercepts. This fellow had been terrorizing our ground school of late, popping up out of the blue, presumably to test our reaction and gauge the range of our recently acquired MK6 Lightnings.

As I headed northeast, I was aware that all airfields to the north of Leuchars were out with iced up runways. Leuchars was wide open and forecast to remain so. Turnhouse (Edinburgh) was the diversion. I was required to land with 1,600 pounds of fuel. This would give 800 pounds on the ground if diverted.

Working overtime on my dead reckoning, I reached the appointed place of intercept forecast by Buchan. On went my radar, and lo and behold, there it was: one of the biggest, fattest blips I had ever seen, on the nose and only 10 miles away. That was good news. The bad news was that we were both on the same heading. A check of fuel gauges estimated 200 pounds to chicken fuel. The temptation to chase was almost overwhelming, but no, I had listened to too many stories from other more experienced pilots and so it was about turn, and contact Buchan with the news.

Five minutes later, unable to raise Buchan, and with no TACAN lock (no TACANs in that part of the North Sea) I spotted a "trailer" above and to the left heading towards me. A glance in the radar showed two blips, probably "Q Two" with tanker support. (Those were the days, tanking at FL 360+ above all the weather in smooth air!). Sure enough, a minute later the blips separated, and shortly afterwards, "Q Two" flashed by to give chase on what must have been by now a long lost cause. In the meantime, a Victor MK 1 completed a very creditable turnabout and rolled out on my nose at half a mile. The radio finally burst into life. My position was established (I was on chicken fuel) and I was offered some fuel. I requested the tanker to maintain a track for Leuchars, and in next to no time, I was behind the port hose closing for contact. The evening sun was right in my eyes, but no sweat, us Lightning pilots were famed for our tanking prowess; no situation was beyond us — Blast! SPOKED him! I delicately backed off only to pull the canvas rim of the basket clean off. The basket collapsed and the canvas rim, complete with beta lights, slid down the probe as a permanent reminder of my misfortune. I reported the damage and asked for the other wing hose. That was also unserviceable I was told, but I could have the centerline hose. I duly stood off to one side for what seemed an eternity while the port hose was wound in and the centerline prepared. Eventually, I was cleared for contact. In I went again — SPOKES! This time, the basket held intact and apparently undamaged. A check of the fuel gauges sent a cold shiver down my spine. I now had insufficient fuel to make the correct landing fuel. If diverted, I might just make the Forth Road Bridge. Oh, well, in for a penny, etc. In I went again —"Contact! Fuel Flows" (probably the sweetest words ever to grace an HQ 1 Group document). I think it was the copilot who then came on the air: "We've just reworked our fuel calcs and can only give you 1,000 pounds. Sorry. Clear to break."

That was it. Back on my own and heading home. Leuchars was still wide open and I landed with 1,050 pounds. My tanking "good deal" had won me 1,000 pounds but lost me 1,550 pounds. I still shudder when I think what might have been if I had collected the centerline rim or if my probe tip had snapped.

Nowadays, I think twice before going for that final bomb close on chicken fuel, or reacting to the F-4 bounce at Blakeney Point when I'm inbound on recovery. My airplane type has changed a few times since the "Aluminium Tube," but the pitfalls remain the same. If you have got a sound plan, stick to it. Don't easily be swayed to a different course of action by another agency. He's not in your cockpit and, therefore, does not know the whole story. ◄

Tanker Tales

A Bad Night at the Boat

By Lt. Ken Coburn

IT was my nugget cruise in the Med. With two months, three port visits and 25 cruise traps under my belt (nine at night), I was having a ball. I thought I had the system licked.

The mission was a long-range air wing strike in northern Italy, and would involve Navy and Air Force tankers, day launch and a "pinky" night recovery.

Dave, my B/N, was a designated air wing strike leader; we would be out front on this hop. I was feeling pretty cocky — I wasn't even a squadron section leader, and here I was leading two F-14s, two A-7s and two KA-6Ds. I made sure there was plenty of film in my camera.

All aspects of the mission from brief to strike went extremely well. On our RTB profile, the E-2 relayed our mission success code to the TAO. When we were 75 miles from the boat, the sun was starting to set, and my TACAN needle was still spinning. Only 1,000 pounds above bingo, we got our first vector from the E-2 and confirmation that the mission tanker was sweet. A few minutes later, the green twirly was in sight and worries about spending the night in Sigonella vanished.

I rendezvoused on the A-7 tanker's left wing just as a gaggle of F-14s detached from his right. I was thinking they must have been there for practice plugs when the A-7 pilot transmitted, "Sorry A-6, there's nothing left for you." Dave confirmed it was, in fact, our mission tanker. It was, but somehow he had missed the brief. Our fuel state was now 4.0, well below bingo. We had one option: trap as soon as possible.

Marshal immediately vectored us toward the CASE III pattern. We began the descent, still without a TACAN and no clear idea of where the ship was. Descending through 7,000 feet we hit the scud layer that was so common in the Med in the summertime. That bright, pink horizon and the clear, starry sky vanished in an instant. It got dark, really dark, blacker than a J.O. bunkroom on Sunday morning.

The TACAN didn't work, the needles didn't work, but the vectors kept coming. We were level at 1,200 feet with the hook down and my cockpit lights set just right when I saw the eerie glow of the yellow flight deck lights pass down my starboard side. The visibility was so bad that I had completely missed the ship, and CATCC had somehow let me! Dave's angry radio transmission was met with two words: "EMCON recovery."

The TAO had made a decision to go EMCON and briefed the air wing about four hours earlier. Unfortunately, we were in the vicinity of the target at that time. The vectors I had assumed were coming from CATCC were really from the E-2.

After a few seconds of stunned silence, I turned the jet to a good downwind heading, dirtied up and descended to 600 feet, in accordance with our EMCON tacnote. We turned to the final bearing on time (there was no chance of following an interval in this goo), and Dave locked up the ship on radar. A moment or two later, a voice on approach frequency reported us at three miles. Dave concurred, and I started a 500-foot-per-minute rate of descent. My response to the three-mile call was automatic. When behind the boat with no needles, a consistent and accurate rate of descent is essential for a good start. My jet was at 600 feet, but my mind was in the CASE III pattern at 1,200 feet.

My instrument scan was working, but somehow altitude awareness was blocked by my intense concentration on attitude, heading and rate of descent. I can't explain why neither Dave nor I heard the radar altimeter alarm when it went off at 350 feet.

At 200 feet I finally recognized how low we were. I arrested the descent with full power and climbed straight ahead to 400 feet. My legs were shaking so badly, I had to take my feet off the rudder pedals. We stayed at 400 feet until I called the ball; our state was 2.5.

High start, over-control, a settle in close, BOLTER, BOLTER, BOLTER!

We immediately turned downwind in a day VFR pattern, Dave transmitting my intention to cut anyone in the pattern out of my way.

At this point, CATCC finally broke radio silence to tell us that a fresh tanker was overhead with 12,000 pounds to give. The TACAN started working, and the ACLS needles came alive. We found the tanker, got our gas and got aboard without adding further color to the evening.

Later that night in the safety of my stateroom, I realized that this wasn't a story to write home about. Two years and 100 night traps later, I can calmly reflect on lessons learned. First, fuel state is the most important parameter in the carrier environment. When working bingo ops, never allow your fuel to go below bingo state, regardless of how close you are to the tanker. Second, speed may be life, but if your situational awareness doesn't include altitude, you're only a few heartbeats from becoming another statistic. Third, in the landing pattern, a B/N is a copilot first and a navigator second.

Finally, they really are trying to kill you. Don't assume that CATCC has control or knows where you are, or even that they have the lights on. ◄

Lt. Coburn is an A-6 instructor pilot with VA-42. He is the squadron pilot NATOPS officer.

The First Marineflieger Tornado squadron, reformed at Schleswig-Jagel in July 1982, was MFG1. One of the squadron's aircraft is seen here deploying its buddy refueling system.

Tornado Tanking

By Lt. David L. Hardwick

There are very few modern scenarios that do not involve the use of tactical tanking. These German aviators wisely used the U.S. Navy's experience to avoid any major mishaps and produced a very steep learning curve for their aircrews.

AFTER 18 months of language, adversary and transition training, I was looking forward to my new assignment flying Tornadoes with the German Navy at an air station near the Baltic coast. I had visions of leading multiplane low-level strikes and no-holds-barred ACM in a bogey-rich environment. I had *not*, however, prepared myself mentally for one of our collateral missions. It seems my new air wing had a new mission with very little expertise to rely on: tanking. I was informed I was to become the air wing tanking expert due to my A-6 tanking experience.

On my second day in the wing, I met the air wing maintenance officer in the hangar. In the corner were several brand new, never used refueling pods. As the MO poured through his stack of accompanying MIs, his assistant and I inspected the new stores. The AMO took copious notes as I strained to remember any maintenance problems my last air wing encountered. We walked through a normal preflight and exhausted my limited knowledge of the pods' internal plumbing.

My first multiplane low-level mission that involved tanking was noteworthy only because of the tanking portion of the hop. The low-level was aggressive, and the ACM that followed was a real challenge.

The tanking went as briefed . . . nonstandard. The rendezvous was downright scary. The tanker pilot helped throughout by changing directions and AOB. The techniques used to plug varied from sideslipping to HUD-boresighting the basket. Power inputs ranged from max afterburner to flameout with the relative closure being, of course, proportional. The final tally was one damaged basket, one damaged probe, one scratched canopy and one *very* scared exchange pilot.

The SOP did not solve all our problems. It did, however, allow all the aircrew to speak the same language.

I knew I could not be quiet during the debrief. I could *not* allow the fact that I was the new guy interfere with what was obviously a badly needed mindset adjustment. I started with the brief and ended up with a few sea stories about dead U.S. naval aviators. The refueling sea stories seem to hit home, and I received the ops officer's promise that we would not fly tanker missions until we had a standard operating procedure and a healthier respect for tanking hazards.

I sat down and listed every possible situation involving tanking and attempted to come up with a safe procedure for each. The final result was a three-page air wing SOP for tanking that contained a three-hop syllabus with a tanker qualified wingman-observer. It also contained an aggressive guide for mission tanking for qualified crewmen in the extreme low-level environment. Working with the tactics officer, I was satisfied we had accomplished standardization as well as enhanced safety and combat readiness.

The SOP did not solve all our problems. It did, however, allow all the aircrews to speak the same language. Unexpected situations arose, but we were now able to fall back on standard practices to enable a safe exit from a bad setup.

Most notable were the briefs; any NATOPS officer or XO would have been proud. Tanking became as much an ego booster as low-level bombing, strafing or ACM. Healthy competition replaced the previous no-respect attitude toward tanking. Safe, expeditious rendezvous; one stab at the basket; and safe departures from the tanker were now routine. Hand signals replaced disorganized radio chatter.

These German aviators deserve the credit for the safe introduction of tanking into their tactical doctrine. There are very few modern scenarios that do not involve the use of tactical tanking. They wisely used the U.S. Navy's experience to avoid any major mishaps and produced a very steep learning curve for their aircrews.

So, the next time you tanker pilots are droning in circles over the North Sea, do not be alarmed if a Tornado slides up on your left wing. He may flash you some standard hand signals and throw his probe out. He's just looking for a few practice plugs. ◄

Lt. Hardwick is an A-6 pilot with VA-85. He served previously with VA-34 and was a wing qualified LSO for CVW-1. From 1984-1987, he was an exchange pilot in the Federal Republic of Germany's Navy Second Squadron, Naval Airwing One, flying Tornadoes.

Photographs courtesy British Aerospace

An RAF Tornado refuels another Tornado using buddy store.

Peter Mersky

View from boomer station during normal refueling.

Probe and Drogue Refueling

A Boomer's View

By MSgt. Rod Perkins, USAF

APPROACH has never had an article from a boom operator, but this special on air refueling wouldn't be complete without a few words from a "boomer." I've had 15 years as a KC-135 boomer with the Strategic Air Command and would like to share some of my views and experiences about probe and drogue refueling.

The KC-135 Stratotanker was originally designed to refuel heavy jet bombers at high altitude. Boeing developed the boom system to allow faster flow rates than were possible using the hose method. This system had obvious benefits, since it allowed faster refueling. Eventually all Air Force aircraft were modified or designed to use the boom method. The Navy and Marine Corps kept the probe and drogue method because the boom was too big and complicated to mount on their aircraft. To accommodate probe-and-drogue-equipped aircraft, a boom drogue assembly (BDA) is installed on the end of the boom to replace the normal nozzle. This installation can only be accomplished on the ground.

From a technical standpoint, the boom operator of the KC-135 doesn't have much to do during probe and drogue refueling, compared to normal boom operations. When refueling with the drogue attachment installed, the boom operator has to fly the boom down from the stowed position, fully extend the outer fuel tube, and hold the boom as motionless as possible at the prescribed position. The receiver pilot makes his own contact, which is contrary to normal procedures in which the receiver flies formation on the tanker and the boomer "flies" the nozzle into contact.

After the receiver pilot has established contact with the drogue he states his call sign and the word "contact." Then the boom operator triggers the boom system to a contact condition and also states tanker call sign and the word "contact." Upon hearing these two radio calls, the copilot of the KC-135

tanker aircraft turns on the air refueling pumps and monitors the fuel offload rate and amount.

During the time the receiver is in contact with the drogue, the boom operator gives verbal corrections to keep the receiver aircraft within the prescribed trail position of the boom and drogue; for example, he'll say, "Back 2" or "Right 2," indicating the direction necessary to return to the refueling position combined with the number of feet of movement required. Some receiver pilots may have heard the term "approaching half hose length." While in contact, this call is probably the most important one you'll hear from a boom operator. When the boom operator calls "half hose length," the receiver pilot has moved forward enough to cause a large loop in the hose that could result in damage to the receiver aircraft.

Once the fuel transfer is done, great care and finesse must be employed to disconnect. When disconnecting from the drogue, the receiver should line up directly behind the drogue before backing out to break contact. If the receiver is too far left or right of the prescribed position when breaking contact, the drogue can cause extensive damage to the receiver aircraft.

The "boomer" of a KC-135 in his position at the rear of the Stratotanker.

Peter Mersky

Finally, a word about radio procedures. Crew members in the receiver aircraft should get a radio check from the boom operator at one-half mile in trail of the tanker. Then the boom operator will establish the refueling order, clear the first receiver to the precontact position (if there is more than one receiver aircraft), and instruct all other receivers to move to the observation position off the wings of the KC-135. After the receiver calls "stabilized, precontact," the boom operator will clear the receiver to the contact position.

For training purposes and ease of operation, the receiver aircraft should cycle from one wing of the tanker to the other. Also, it is a good technique to rendezvous low and exit the tanker high.* This procedure is helpful when qualifying multiple receivers in an anchor refueling situation. Now for some of my personal experiences.

I was initially qualified in probe and drogue procedures in 1973 refueling Air Force F-100s. Due to thrust limitations of the Super Sabre, we had to refuel in a descent so that the receiver could keep up. From 1973 to about 1975 I participated in several large fighter unit deployment missions across the Atlantic, refueling F-100s to Europe. On one particular mission the weather was extremely bad, with moderate to severe turbulence throughout. I had an F-100 on the basket who, upon disconnect, bent his probe about 45 degrees to the right. With two refuelings left to make landfall, he had to make his remaining contacts with considerable aileron control input and a lot of rudder. He had to do a little "dogtracking" behind the tankers but was able to get the fuel he needed.

I refueled Marine F-4s on several deployments both to and from Hawaii. I also have had the opportunity to qualify Navy squadrons operating off a carrier prior to their deployment at sea, and believe me, that was a gaggle. I have never seen so many different aircraft in the same airspace at the same time. They tended to all arrive simultaneously, jockeying for position, all wanting to get their minimum number of contacts to retain their refueling qualification. On that mission there was only one mishap — an F-14 lost the end of its probe during disconnect. I also had the pleasure of briefing and qualifying a Marine F/A-18 squadron from Southern California. During the premission briefing, we showed an Air Force videotape on air refueling procedures. After the tape was over, I explained that the basket they would be plugging that morning was not flexible and would do visible damage if it came in contact with their aircraft. I noticed that the younger pilots were letting the older pilots lead the discussion. After the briefing it was amazing how many of the younger pilots (never having refueled behind a KC-135) then broke formation from the old heads and cornered me, wanting more specifics about the procedures to be used during that day's refueling operations.

I feel honored to write this article to get the word out to our Navy and Marine counterparts. Fly safely and I hope to see you someday behind the drogue of our KC-135.

**NAVAIR 00-80T-110 (Air Refueling NATOPS) calls for rendezvous 1,000 feet below tanker base altitude with KC-135 and KC-10 aircraft. Separation is as coordinated between tank and receiver leader. — Ed.*

MSgt. Perkins is a KC-135 boom operator with the 924th Air Refueling Squadron based at Castle AFB, Calif.

I Can Hack It

By Lt. James R. Knapp

ONCE again it is time to renew my night qual. No problem — a Case III launch and recovery with a few night intercepts thrown in for good measure. One trap tonight and another tomorrow night and "presto!" — I'm a qual. In preparation for the at-sea period, I had flown six bounce periods (right about average for us forward-deployed kind of guys). True, I hadn't flown the first six days out for a lot of reasons, but I had two day traps and one touch-and-go in the last couple of days. I felt ready to go. Besides, because of some great CONUS TAD, my last night trap was

only 5½ months ago.

"Whattya mean, 'No gas for the CAP?' Don't they know we're 'real world' here?" I ask the duty officer just before I walk to my jet.

"Hey, back off! I'm just the talking dog here. Air Ops is the villain," the SDO replies in an injured tone.

Well, that's just great. I guess the gas would have been gravy anyway. I can make it without tanking. Let's see, one little gripe about fuel venting while transferring the drops if the internal bag is full. No sweat! I'll just hold the transfer until I'm down to 7K internal. Other than that, the trusty Hornet is 4.0.

Jeez, do I have my day visor down, or is it really this dark? Good preflight, start is normal, all checks — great, ready to go. Taxi up to cat 2. Roger the weight board . . . oops, dropped my flashlight. Luckily, it's an idiot flashlight, tied to my torso with about 9 feet of nylon line. Keep taxiing, turn left, reel in the flashlight and hope it doesn't get caught in the ejection handle; double-check takeoff checks. Tension! Everything looks good. Lights on. Rats! Forgot to turn on the HUD. Ooof! Airborne. Airspeed looks good. Instruments working OK. Wonder how my attitude's doing?

God or the Air Boss thinks I should "Keep it climbing!"

I take the suggestion to heart and pull it out of afterburner and raise the gear as I'm passing 2,500 feet.

My pulse starts to return to normal as I reach my assigned CAP station. I'll just let George fly her for awhile. Dang, climbing and still IMC at 22K. Level off and *still* IMC at 28K. I'll climb up to look for VMC a little later when I'm lighter. This could be a long night.

Those strobe lights are really annoying in the goo; I'll just turn them off for awhile.

"Bingo! Bingo!" Why'd they pick a computer voice that sounds like a female Wehrmacht commando? Oh, well, at least she's right. Seven thousand internal — time to transfer the drops. Both drops transferring, something's going right tonight.

Guess I'll try the strobes again. Great, not as bad as before. Looks like "vapes" coming off the vertical stabs; that's strange. Damn! That's fuel! Transfer off. Too late, the damage is done — 800 pounds above my fuel ladder to 1,200 pounds below in a heartbeat.

Dandy, just dandy. At least I'm light enough to climb out of this soup. Still IMC at 35K. Where's the icing level anyway? Wish I'd listened more closely to the weather brief. Oh, well, I can hack it up here. I just hope this vertigo goes away soon.

When I check into marshal with my fuel state, their response is an incredulous, "say again fuel state!" I repeat my state, and the signal is "Tank." I could probably hack it, but why turn down gas? Maybe because I've got a solid case of vertigo and I haven't night tanked since my last night trap. I'm probably going to remember this hop.

Departure vectors me to my tanker just as he calls "We're at 5K climbing to 7K for weather." I arrive at 7K and see that, yep, he did it; he found the weather. At a quarter mile, the tanker disappears as we go IMC yet again. Breaking out, I join just before we enter the clouds again. We're in and out of the stuff as the basket moves randomly in the cross currents, maddeningly close to, but never on, my probe. Twelve rounds of sparring follow, and the basket is way ahead on all fight cards. A timely head fake surprises the basket, and I get my allotted gas, not to mention a raging case of vertigo.

Having hacked the tanking, I check back into marshal and decel smartly through 160 knots as I copy my instructions. Damn! Where's my scan?

Twenty-five miles and three minutes to push — no hill for a stepper. An idle 5g turn miraculously puts me at 248 knots pushing "on time." The problem, I fully realize, is that I left what little scan I had back on the tanker. I've had no time to mentally prepare myself for this last crucial phase of the flight.

Somehow, I successfully chase the ILS needles to a decent start. I go a little low on the ball call and squeak on some power to correct. Meatball, lineup, AOA. Meatball, needles — needles show me high. Oops! Lined up left now. Squeak off some power for the high, make the lineup correction, anticipate the burble . . .

"Power back on," a calm, confident LSO voice crackles over the UHF.

Get outta here! I can spot the deck with the best of them. I'm still high!

"Power . . . WAVE OFF!" a new LSO voice, and this one's scared. Me too!

The ball's red and falling. Full power from the Hornet's two F-404 engines saves me, but the 1-wire cuts my wave-off embarrassingly short. My feet beat a staccato rhythm on the rudder pedals as my knees shake uncontrollably during the taxi up the deck.

Later in the reflective calm of the ready room, I review the mistakes that led to my most unforgettable night pass. Given the known fuel-system discrepancy, I should have monitored my fuel more closely and caught it long before 2,000 pounds had been irretrievably lost. I didn't listen to the weather brief close enough to determine what altitudes would be best to work during the course of the hop. During the final portion of the hop, my "I can hack it" attitude set me up for a bad pass. I first accepted a bad tanking altitude knowing full well that there was clear weather just above us. Secondly, I accepted an unreasonable approach time because I didn't want to hold up the recovery. The end result was a poor approach that the LSO had to dig me out of.

Fortunately, the only damage was a lowered landing grade average and a slightly more colorful call sign — all in all, a fairly cheap lesson. As pilots-in-command, it's our responsibility to control as many factors as possible to assure the safe completion of our assigned mission. A two- or three-minute delay was probably all I would have needed to straighten out my head and make a safe, normal approach. Remember, everyone out there is trying to kill you — they don't need your help. ◄

Lt. Knapp is acting safety and NATOPS officer for VFA-195.

The Dead

By Lt. Jeff Amick

IT was a cloudy night in the Sea of Japan. It was our turn to take our EA-6B Prowler off the pointy end. There were cloud decks from 1,000 to 20,000 feet.

We returned to marshal at our assigned time and took the Prowler's position at the bottom of the stack. Marshal gave us our expected approach time and announced, "Blue water ramp and tank fuels are in effect." For us that meant ramp at 6,000 pounds and tank at 4,000 pounds. However, there was a nearby Air Force field open that was a suitable bingo field. We calculated our bingo fuel to this field at 3,500 pounds.

We reached our push time with 7,500 pounds of fuel and commenced our approach. Everything was looking good, and we were all set up at three-quarters of a mile when the dreaded wave-off lights came on.

"Wave it off, foul deck," said the LSO. I hate it when that happens! We climbed confidently back into the overcast. Our fuel was 7,000 pounds.

After a two-mile upwind and extended downwind, we were back on our way down the glide slope. Once again, below the overcast with the ship in sight, we were feeling good, at least until we saw a flash on the flight deck and the LSO announced that the F-14 had blown a tire and fouled the deck. On the wave-off, our state was 5,800 pounds.

We had to make one orbit while the ship held a FOD walkdown. On the second go-around, we informed marshal that we were "tank plus one" with 5,000 pounds of fuel remaining. They told us that they were going to set us up with a long interval behind an A-6 to ensure the deck would be clear for us this time around. "Someone really does care," I thought to myself. I was confident that we would have a clear deck, but at three-quarters of a mile, I looked up and saw the A-6 *still* in the landing area.

"Wave it off, A-6 just had a hydraulic failure in the wires," said the LSO. It was becoming obvious that this was not our night.

"Electric, your signal is tank. Clean up and climb . . . report passing angels two."

"All right," I thought, "we've got 4,000 pounds of gas, and we're climbing for the tanker. If all else fails, we can still bingo with 3,500 pounds."

"Electric, continue your climb straight ahead, tankers are consolidating at two-five thousand." . . . two-five thousand?! It *finally* occurred to me that the weather wasn't good enough for a tanker to hawk the pattern at 2,500 feet. Still, someone could have told us there wasn't a tanker. We switched up control frequency and reported that we were climbing to 25,000 feet. Fifteen miles from the ship, still climbing straight ahead, I asked to turn back overhead. After being told twice to continue straight ahead, I confirmed with control that the tankers were still *overhead* and turned back toward the ship.

Now on top, we began to search for our tanker. With some vectors from control, we found a jet with a green "twirly" and began to rendezvous. We were almost aboard when our tanker descended into the overcast.

"Control, our tanker just descended into the overcast." The controller denied that and informed us that our tanker was the only other jet there, and he was still at 25,000.

"Control, this is the off-going tanker; we just consolidated and descended out of 25,000." *Definitely not my night!*

Try tanking at 25,000 feet, at night, with the low-level fuel light staring you in the face. It's not fun. Anyway, we got our gas and returned to the carrier to get that OK 3-wire . . . finally!

End Path

Now our fuel was 2,500 pounds, we were below our bingo and no tanker in sight! How did I let this happen? I had run myself down that dead end path, and there was nowhere else to go but straight ahead.

There was that one way out, though. A tanker was still up here someplace. "Control, this is Mission Tanker. I heard all the commotion and returned overhead. I have the Electric in sight and will join on him." "Electric, go midnight." I did that but got more bad news. "Control, I guess I am joining on the other tanker." I saw the two tankers and joined on them. We got aboard and plugged the tanker. Wish I could tell you I hit the basket the first time, but I didn't. Try tanking at 25,000 feet, at night, with the low-fuel light staring you in the face. It's not fun. Anyway, we got our gas and returned to the carrier to get that OK 3-wire . . . finally!

We had a long series of debriefs with controllers and supervisors. There were a lot of people who *could* have done more to help avoid the situation. Marshal *could* have announced prior to the recovery that there was no hawk tanker available due to weather. When we were climbing to 25,000 feet, marshal *could* have given us better vectors to join the tanker. Someone *could* have made sure that there was only one tanker in the area. We burned far too much gas trying to join on the wrong aircraft. The tanker has all the gas; he *could* have joined on us.

All of these "could have's" are good ideas for next time. However, there is really only one *should have*. There's no pointing fingers on that one. *I* should have avoided this situation. *I* should have been on a bingo profile once we reached bingo fuel. Some will argue that the ship was briefing "blue water ops," so we were confined to tanking. I don't believe that for a minute, and I hope no one else does. There is only one person ultimately responsible for those lives and that aircraft — the pilot! ◄

Lt. Amick flies Prowlers for VAQ-131, and is the squadron aircraft division officer.

"... tankers are consolidating at two-five thousand." ... two-five thousand?!

JP-4 vs. JP-5

How to Irritate the Air Wing by Wasting Too Much of Their Gas

By Lt. M.L. Busbee

ALL good naval aviators know that JP-5 is the fuel of choice aboard aircraft carriers. Some of these aviators might not understand why. Or why, after refueling from Air Force tankers, they can't defuel JP-4 into the ship's reclamation fuel system. After reading this article, they shouldn't have to bother their friendly V-4 division officer or top grape anymore.

Let's review a little history of aviation fuel on board CVs. We used to have reciprocating aircraft, which used aviation gasoline (AVGAS) for their engines. AVGAS is very dangerous stuff with a flash point of -45 degrees Fahrenheit. The AVGAS tanks were surrounded with cofferdams or sealing tanks filled with ½ psig of nitrogen. Nitrogen is a colorless, odorless, tasteless, inert gas that displaces oxygen and won't transmit electricity. It was perfect for cofferdams and made keeping AVGAS relatively safe. A few people died, however, when the N_2 leaked out and displaced the O_2 they were breathing while working in isolated filler rooms.

The jet age came and with it, new fuels. The only gasoline kept on board today's carrier is a small amount to run the bomb hoist motors that are similar to chain saw engines. If the C-1 comes out, he better have enough gas to get back or the pilot will have to ride the ship in. A choice had to be made by the Navy between using JP-4 (which is a mixture of gasoline and kerosene) and JP-5 (which is just a straight highly refined kerosene).

JP-4 has a flash point of 30 degrees Fahrenheit, which is higher than AVGAS but not nearly as high as the minimum 140 degree Fahrenheit flash point for JP-5. The Air Force can fight their fuel fires on land easier than the Navy can fight them on a ship. The Air Force can also move to safer ground when the fire gets out of control; Navy personnel do not have the luxury of leaving a burning ship. Needless to say, Navy chose JP-5.

So, safety is the main reason the Navy uses JP-5, but that still doesn't explain why we can't defuel JP-4 into the ship's reclamation tanks or just clean it out of the JP-5. A little knowledge of the CV aviation fuel system will explain.

During replenishment, JP-5 is first put into the reclamation tank until a sample is taken to determine if it is good fuel (i.e., really JP-5 not DFM, lube oil, JP-4 or mostly water). The fuel is tested for water content, flash point, sediment and anti-freeze. After the fuel is determined to be good enough to buy, it is put into the storage tanks that make up the majority of the 1.6 million gallon JP-5 capacity of a typical CV.

The fuel is sent through centrifugal purifiers that spin at 4,100 rpm and clean out the heavier sediment and water. The purifier will not clean out JP-4 since it mixes too well with the JP-5 and has almost exactly the same weight. After purifying, the fuel is sent to the service tanks and is clean enough to put into aircraft. But just to make sure, the fuel is then run through filters the size of Volkswagens before it is sent to the flight deck. The fuel goes through a one-hundred mesh filter in the fuel nozzles just before entering the aircraft. Once inside

the aircraft there are more fuel filters to pass through before the fuel gets to the engines.

To make sure the fuel stays clean all along the fuel chain, it is sampled at each stage. In the QA lab the fuel is run through millipore filters, which are similar to coffee filters. A light meter reads the difference between clean and dirty fuel. Any red dye in the fuel (as used by some squadrons for leak detection) would color the filters and give an erroneous reading. The maximum sediment allowed is two milligrams per liter. The maximum water content is five parts per million. Normal fuel is much cleaner with no water and only .4 mg of sediment per liter.

Flash point is also checked periodically to make sure the fuel is pure JP-5. As little as 5 percent JP-4 mixed with JP-5 will lower the JP-5 flash point below the required minimum of 140 degrees Fahrenheit. JP-5 normally has a flash point of about 144 degrees Fahrenheit.

The CV NATOPS conference of November 1985 recommended the following change for CV NATOPS, which was subsequently adopted into the current CV NATOPS.

Warning

Aircraft recovering aboard the CV with fuel other than JP-5 shall notify the appropriate authority in accordance with ship/air wing SOP prior to recovery.

Many ships have established guidance as follows:

Aircraft containing fuel other than JP-5 shall not be parked on the hangar deck without commanding officer's approval. Upon notification from operations that an aircraft recovering has fuel other than JP-5 on board, the air officer will immediately notify the aircraft handling officer and announce over the 5MC that a low flash point aircraft is about to be recovered. Squadron maintenance will be notified to physically mark the aircraft upon recovery.

Many ships mark their aircraft carrying fuel other than JP-5 with a red "x" (size 12 inches by 12 inches) across the port and starboard side of the nose. Red "x" consists of tape (ordnance type) that will remain on the aircraft until it has been certified that the aircraft no longer contains low flash point fuel (normally after five refuelings with JP-5). Aircraft carrying JP-4 or other low flash point fuels so marked will not be parked on the hangar deck without CO's approval and shall be afforded consideration for accessibility by fire equipment when parked on the flight deck or hangar deck.

Aircraft with fuel other than JP-5 should never be defueled into the aviation fuel system. Squadron maintenance personnel are responsible for notifying the fuels officer of any aircraft carrying low flash point fuel. Prior to any defueling operation, the aviation fuels officer shall ensure that the fuel being removed is of satisfactory flash point for shipboard storage.

Recent tests have confirmed that currently available fire extinguishing systems are essentially ineffective against a JP-4 running source debris pile type of fire. This is true for a fuel mixture with as little as 5 percent JP-4. The rate of flame travel across the surface of spilled fuel can be measured as inches per second for JP-5 compared to yards per second for JP-4. Under such circumstances a man cannot outrun the fire's spread on a ship's deck.

Aircraft returning with low flash point fuel should be kept on the flight deck and flown or defueled over the side (provided the ship is over 50 miles from shore). These JP-4 aircraft should not be parked on top of hot catapults.

I hope this article cleared up any misconceptions about why JP-4 is a no-no aboard carriers. For any further questions, contact your friendly V-4 division officer. ◄

Air Force tankers cannot internally segregate JP-4 for propulsion and JP-5 for off-load. They would have to be totally loaded with JP-5 in order to have JP-5 as the off-load product. Even then, the residual JP-4 in the tanks would reduce the flash point at the rate of 5-7 degrees per 1 percent of JP-4 remaining aboard from previous flights. The alternative is to not use Air Force tankers, which would greatly reduce the operational flexibility of the carrier. — Ed.

Lt. Busbee is the fuels officer in USS *Ranger* (CV-61).

While the problem is primarily with JP-4, a reduction in flash point can result with mixing of JP-8 or commercial JET A-1 fuels, which may also be available from airborne tankers or divert fields. These fuels have higher flash points than JP-4 (approximately 100 degrees Fahrenheit) and do not create the same dangerous vapor pressure problem. However, any fuel flash point below 140 degrees Fahrenheit is considered dangerous. Special attention is necessary.

Adapted from CNO Washington, DC 191736Z Apr 83

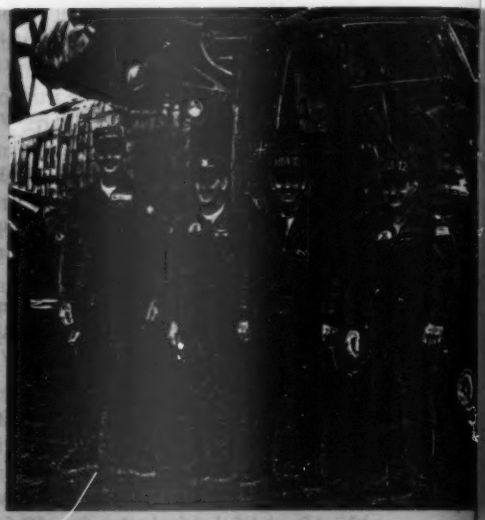
Capt. Jim Ogershok, USMC
Capt. Eddie Feltman, USMCR
Sgt. Mike Bishop, USMC
HMM-266

After a refueling stop at Peoria Airport, Capt. Ogershok (PIC) began his takeoff transition. The CH-46E was at maximum gross weight and because of the close proximity of wires, other turning helicopters and snow banks, an obstacle clearance takeoff was required. As a result of numerous reports of divergent oscillations in the CH-46 community, Capt. Feltman (copilot), as briefed, had his hand on the Stability Augmentation System (SAS) switch, ready to disengage the system.

As soon as the aircraft lifted off, it began to violently oscillate. Capt. Ogerhsok ordered the SAS to be switched off. However, the oscillations were so severe that the SAS control knob came off in the copilot's hand. By this time, the aircraft was nearly uncontrollable. Capt. Ogershok knew that as long as the oscillations continued, a successful landing would not be possible.

Capt. Ogerhsok maintained control of the aircraft and made repeated calls to secure the SAS. Sgt. Bishop (crew chief), in the rear of the aircraft, realized the situation and its dangerous consequences. He pulled himself up to the cockpit to assist the copilot, but was unaware that the SAS control knob had come off until he saw the copilot trying to replace it. Sgt. Bishop fought his way back to the cabin area, located his safety wire pliers and crawled back to the cockpit. Lying across and bracing himself on the center console, he was finally able to grab the stub of the SAS switch and secure the SAS system, stopping the oscillations. By the pilots' airmanship, and Sgt. Bishop's quick thinking, resourcefulness and knowledge of the aircraft, the crew saved their passengers and the aircraft.

Left to right:
Capt. Eddie Feltman,
Sgt. Mike Bishop,
Capt. Jim Ogershok



Lt. Bob Turman
Lt. Mike Wells
AMH2 Shawn Stringer
AMS2 Richard Lemcool
AMS3 Tom Eichsteadt
HM-12

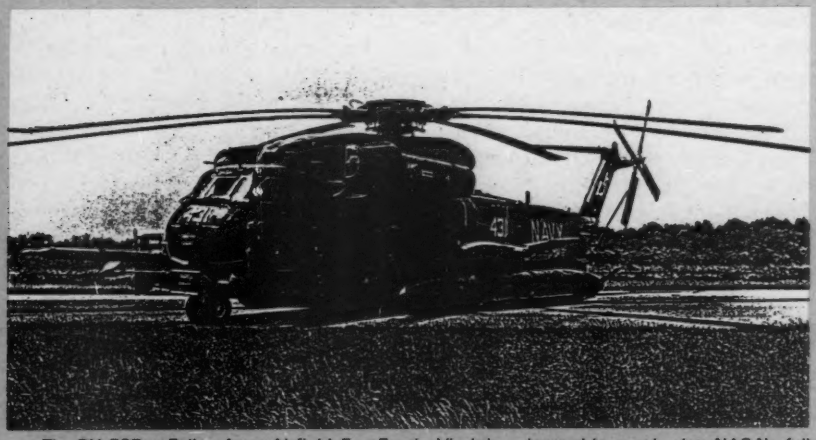
Lt. Turman (HAC) and replacement pilot, Lt. Wells, were on an RH-53D training flight. After completing several touch-and-gos at a nearby auxiliary air field (AAF), Lt. Wells reported a low humming sound. With no other indications of an impending problem, they continued downwind for a precautionary landing while the aircrewmen attempted to identify the noise source.

The humming steadily increased in volume. On short final, it was loud enough to drown out all other aircraft sounds. No caution or advisory lights were illuminated. Since another aircraft was back-taxiing on the only runway, Lt. Turman chose to perform a no-hover landing at the approach end.

While the Sea Stallion was in the flare at approximately 30 feet AGL, a loud pop was heard and the humming noise ceased. The aircraft began an immediate uncommanded right

BRAVO ZULU

Left to right,
AMS2 Richard Lemcool, AMH2 Shawn Stringer,
Lt. Mike Wells and Lt. Bob Turman. Not pictured,
AMS3 Tom Eichsteadt



The RH-53D at Felker Army Airfield, Fort Eustis, Virginia, prior to shipment back to NAS Norfolk. The aircraft is being rebuilt by NARF Pensacola and will be returned to service.

yaw; Lt. Turman's immediate full left rudder had no effect. Recognizing a tail rotor drive failure, he lowered the collective, and Lt. Wells secured the engines. The aircraft hit in a slight left drift and nearly rolled over.

Investigation revealed a catastrophic failure of the tail rotor takeoff gear inside the main transmission.

The decisive and coordinated actions of Lt. Turman and Lt. Wells, during one of the most serious emergencies that can be experienced in the H-53 helicopter, prevented any injuries and kept aircraft damage to a minimum.

LCdr. Bill Tyson
Lt. Tip Sharp
Lt. Mark Cantrell
Lt. Kevin Oakes
ATC Jerry Campbell
VAW-124

The crew of Bear Ace 603 had just finished a blue-water airborne early warning mission at night. The pilot, LCdr. Tyson, disengaged the autopilot and was startled when the aircraft suddenly pitched approximately 45 degrees nose down. Contending with a binding in the control column, he applied about 40 to 50 pounds of aft yoke force. Near flight level 190, he managed to wrestle the aircraft to a level flight attitude.

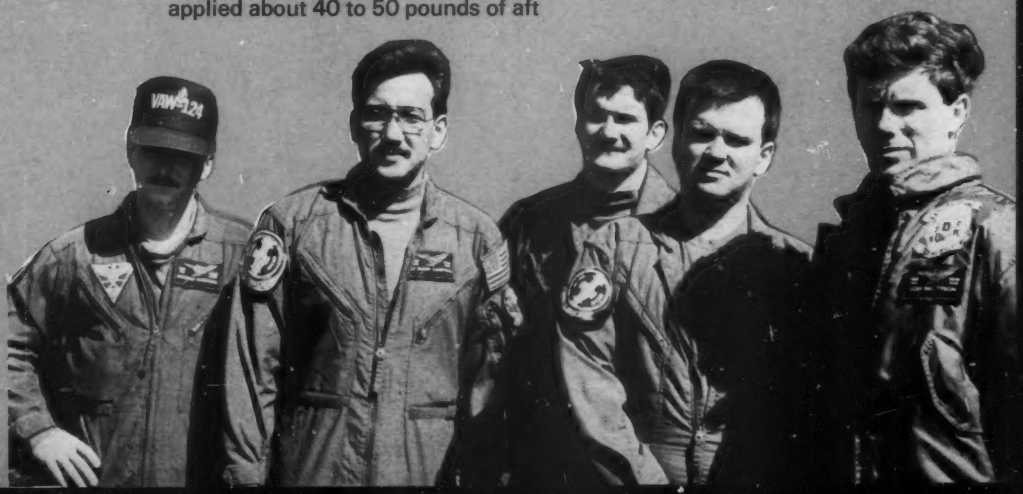
The copilot, Lt. Sharp, reset the appropriate circuit breakers, tried to evaluate the cause of the problem, and searched the NATOPS for possible solutions.

Having first assessed the possibility of an elevator disconnect, the pilot notified the crew members, Lt. Cantrell, Lt. Oakes and ATC Campbell, to get ready for a possible bailout. They followed prescribed procedures and established an accurate position which they passed to their ship.

After determining the amount of fuel on board and deciding that the distance to the nearest field ruled out a bingo, LCdr. Tyson tested the aircraft in various configurations, finding it to be marginally controllable in the landing configuration. Receiving radar vectors, 603 started the approach, encountering IMC conditions at 8,000 feet MSL.

Without the benefit of SPN-42 needles, but with guiding vectors from CATCC the aircraft broke out about 2 nm and 800 feet MSL in rain showers. The deck was pitching with 38 knots of wind, but an OK pass was still accomplished. Postflight inspection revealed the source of the problem to be a failed pitch trim actuator.

Continued



Left to right,
ATC Jerry Campbell,
Lt. Mark Cantrell,
Lt. Kevin Oakes,
Lt. Tip Sharp,
LCdr. Bill Tyson.

Cdr. William D. Stewart
Lt. Robert W. Hollocher
AO1 Paul E. Brotherton
AD2 Robert A. Lueken
AD3 Mike Elrod
HM-14

While en route to the Farsi Island minefields in the Persian Gulf to conduct airborne mine countermeasures, the crew of an RH-53D heard a loud "bang." They felt severe aircraft vibrations and saw smoke coming from the main gear box section. Cdr. Stewart (HAC) immediately began a slow descent while trying to maintain control of the stricken helicopter; he notified the LPH of the emergency.

Lt. Hollocher (copilot) reported cockpit indications of imminent main rotor blade failure, a tail gear box chip caution light, and a No. 2 engine nose gear box overtemp.

As Cdr. Stewart approached a 10-foot hover over the water, he notified the ship of his position and intentions to ditch. The LPH increased its speed to close the distance. The crew consisted of AO1 Brotherton (1st crew), AD2 Lueken (handler) and AD3 Elrod (ramp man). They quickly reviewed their pre-briefed ditching procedures.

Cdr. Stewart ordered auxiliary fuel tanks and emergency exit windows jettisoned. The survival raft was positioned for ditching; and, on his order, the crewmen egressed from the personnel door, followed by Lt. Hollocher.

As Cdr. Stewart air-taxied clear of his crew prior to ditching, he found the aircraft more controllable because it was lighter. He elected to air-taxi toward the ship, intending to ditch if the conditions deteriorated further.

After air-taxiing 10 miles, Cdr. Stewart was able to climb the helicopter to the deck and land safely. His crew was recovered without incident by the ship's UH-1N.

Postflight investigation revealed that the blower pulley in the No. 2 nose gear box oil cooler had separated, puncturing a main rotor blade spar, and then had traveled aft to strike and severely damage a tail rotor blade. This damage caused the blade balance weights to separate, resulting in stress damage to the tail rotor gear box. The out-of-balance condition of the tail rotor created vibratory loads so great that most of the aircraft avionics boxes had been ripped from their shock mounts.

Top-notch airmanship and quick response to an evolving emergency situation were primary ingredients in this incident. The crew's backup and rapid egress enabled Cdr. Stewart to continually reevaluate the problem and ultimately save a valuable aircraft in a hazardous geographic area.

LCdr. Jeff Linscott
Ltjg. Allison Webster-Giddings
AECS Rod Tafoya
AMS1 Joe Decosta
HC-6

LCdr. Linscott, Ltjg. Webster-Giddings, AECS Tafoya and AMS1 Decosta were crewing HW-01, an HH-46A, on a cross country flight to Charleston Air Force Base en route to USS *Mount Baker* (AE-34).

The hop proceeded uneventfully to a point 13 miles from the AFB. At this point, the No. 2 engine failed without warning. LCdr. Linscott, the aircraft commander, took the controls and proceeded through the single-engine procedures as Ltjg. Webster-Giddings started the auxiliary power unit and completed emergency checklist items. An emergency was declared with Charleston Approach Control.

High gross weight and density altitude severely reduced the aircraft's performance to the point that even with optimum airspeed and dropping rotor RPM to 94 percent, level flight could not be maintained, and the aircraft began a shallow descent from 1,000 feet AGL.

With 10 passengers on board, the crew contemplated jettisoning internal cargo. The decision was made not to dump fuel or cargo due to overflight of residential areas. The lack of a suitable landing site dictated the flight continue to the Air Force base. LCdr. Linscott was able to keep the helicopter airborne as he executed

Left to right: AO1 Paul E. Brotherton, AD3 Mike E. Elrod, Lt. Robert W. Hollocher and AD2 Robert A. Lueken.

Left to right,
AMS1 Joe Decosta,
AECS Rod Tafoya,
LCdr. Jeff Linscott and
Ltjg. Allison Webster-Giddings.

a flawless approach to an uneventful landing. Postflight investigation revealed a failed radial drive shaft as the probable cause of the catastrophic engine failure.

LCdr. Carter Greenwood
Lt. Thomas Midtgaard
Lt. R.A. Rall
Ltjg. Gary Steinhilber
AT2 Chris Andrews
VAW-115

Liberty 600 was returning to NAF Kadena from a routine training mission. The crew overheard a guard transmission stating a Marine A-6 Intruder crew had ejected 81 nm from Okinawa. Air Force SAR teams were mobilized and en route for the search. The E-2 crew realized that by the time the C-130 and HH-53 arrived on station, the search datum could change dramatically.

The E-2 climbed from the approach to mission profile, nursing a marginal avionics cooling system, and attempted to establish an ADF cut to the UHF beacon. While the Air Force searched low and down to the south at the broadcast ejection point, the E-2 crew continued at high altitude using intermittent ADF cuts and working north. Flying over a thick overcast, they finally found the beacon 80 miles from the SAR teams! The C-130 was immediately vectored in to confirm the A-6 crew position. Fifteen minutes later the A-6 crew reported hearing an aircraft and popped flares as the C-130 crew reported sighting sea dye markers.

At that moment, the E-2C's avionics cooling system finally quit and the E-2's forward equipment compartment filled with smoke. After shutting down all systems and executing smoke-and-fume procedures, the E-2 made an uneventful recovery at NAF Kadena.

With a typhoon only 12 hours from Okinawa, a marginal avionics cooling system, night fast approaching and search datum 80 miles from the downed A-6, it took the crew of Liberty 600 only 45 minutes to locate and ensure rescue of the Intruder crew.

From left to right:
LCdr. Carter Greenwood,
AT2 Chris Andrews,
Lt. R.A. Rall,
Ltjg. Gary Steinhilber and
Lt. Thomas Midtgaard.

All the Pieces to the Puzzle

By Lt. Thomas W. Hills and Lt. William J. Cain

. . . All carrier aviators know that their destinies are often decided by other, more senior, carrier aviators sitting in the cozy glow of red lights far below in the CV . . .

IT was the kind of night that makes many carrier aviators wonder if they aren't crazy after all. A low broken layer had appeared at sunset. Haze obscured what was left of a horizon while 14-foot swells rolled by, hurried on their way by high winds.

Low clouds always quicken the heart on night traps, but the prospect of landing on a dark deck pitching in excess of 20 feet would make the landing a truly aerobic exercise. We secretly hoped the flight schedule would be cancelled, but the show had to go on. Ten aircraft and assorted aircrew launched at dusk on a 1,000-mile strike, with the "promise" of a divert if the deck was dancing on their return.

The launch went as scheduled with only one aircraft staying on deck with mechanical difficulties. That's where we came in. As we walked back to the ready room, we commented on how badly we needed the flight time but were (inwardly of course) glad to pass up a night MOVLAS pitching deck arrestment. Having just hung up our G-suits, we received word to suit up again and hurry to flight deck control until the tanker, 520, recovered. The fun was beginning.

The dance had started without us. The strike support package (three A-7s, an F-14, a KA-6D and an E-2) had returned and were fearlessly hurling themselves at the deck. Several unsuccessful attempts had been made when we walked into flight deck control. No one was able to recover. Yet, there was very little gas in the air, and the nearest divert was 390 nm away.

After heated debate, it was decided that the quickest way to get more gas airborne was for us to jump in 520 after it recovered, hot pump and blast-off into the night. We were to stop fueling at 21K and hustle to cat 4. This fuel load was 5K less than a full KA-6D tanker load. Our lower fuel state was never passed up the line nor did we do so later.

Meanwhile, back at the dance, things were getting more exciting than any rock group we had ever seen.

Our tanker boltered twice, drained the duty tanker and finally trapped 3K below bingo. He was lucky — the A-7s faired considerably worse. The first A-7 lost his hook point and was sent to NAS divert.

The "happy camper award" for the evening went to 407. As he came down, the deck came up. In a shower of sparks, rubber and spare parts, he flew off the angle with some real NATOPS procedures on his hands.

We watched all this from the flight deck while strapped to 520. My deep respect for pitching deck night MOVLAS traps instantly became religious reverence! Unfortunately, before I could spell E-X-P-E-D-I-T-I-O-U-S, we were in tension on the cat watching the shooter time our takeoff with the swells.

"Gear up, flaps and slats down, basket out, right turn . . . 407 got us in sight, we're at 200 knots climbing to 4.5, you're cleared in!" We spent the next 15 minutes concentrating on being a smooth tanking platform and waiting for the "valve open/fuel flow" lights to illuminate on the refueling panel. Knowing the pilot's experience level made the waiting that much more difficult. He finally began receiving the first of 4,000 pounds, 40 nm outbound on the divert radial. All this time we're burning about 8,500 pounds per hour.

Tanking complete, we were directed to return overhead and inspect the damage to 407. Level at 16,500 feet, we passed the lead and positioned ourselves to take a look. What we saw was not pretty. The left tire was blown, and the two struts had broken free and were dangling precariously in the airstream. The options were narrowed to a pitching deck barricade or a divert.

We again set out on the bingo radial transferring more fuel to 407. I quickly switched through our fuel quantity after we were told, "pump him up to 12.0." We had been so occupied with his problems that we had painted ourselves into a corner!

We instinctively turned our transfer switch off as the fuel transferred counter clicked past 6,200. Aircraft 407 had received a total of 10,200 pounds over a 45-minute period, during which we had consumed 6,300 pounds! Our discomfort turned to real concern when we heard "return overhead, say your state."

The reply was direct and to the point, "Our state is 4.3, no kidding!" We both remembered looking up our "optimum profile, 400 nm bingo from sea level." We were now exactly 2.2 below that, heading the opposite direction.

All carrier aviators know that their destinies are often decided by other, more senior, carrier aviators sitting in the cozy glow of red lights far below in the CV. This evening was

no different. With the engines running at the lowest possible RPM required for controlled flight, we waited anxiously for the order to divert. We researched our own PCL and decided that, if told to steer, the drop-tanks were history. We began our bingo shortly thereafter. The ship recalculated our fuel requirements and told us to jettison our externals probably at the same time the drops hit the water after falling 23,000 feet.

Our instrument scan during the bingo consisted only of fuel gauge and DME. We had a 50-knot head wind, so we incorporated groundspeed and time to go (DME) versus fuel flow (fuel gauge.) The scenery was pretty dull at 43,000 feet in the dark, and the cockpit got very quiet as we privately contemplated a cold, dark, overwater silk let down.

We breathed a little easier when we began our descent at 99 DME, but the illumination of the low fuel light at 85 DME rudely reminded us of our fuel state. The runway orientation allowed us to save a little fuel because we could execute a straight-in without changing our bingo heading. We stayed at idle until three nm on final when we dirtied up. We finally let ourselves relax a little. However, the canopy defog system in the A-6 occasionally freezes closed at high altitudes and becomes inoperative. This particular hop turned out to be just such an occasion. As we passed through 2,000 feet into the warm, tropical night air, our supercooled canopy instantly clouded up. We made our landing, flying 22 units AOA with a decent of 500 FPM. While scanning the runway lights, we saw a small clear area on the left quarter panel. We taxied off the runway with 1,200 pounds indicated. Had we kept the drop-tanks, our state would have been 800 pounds less.

We would never have refused 407 the fuel he required. However, we found out later that he did not need all the fuel he was given. Understandably, there was a moderate cushion built in. The senior aviators far below in the CV never knew we took off 5,000 pounds below max gross, and they acted accordingly.

Many decisions are out of our hands in the CV environment. We need to make an effort to provide all the pieces to the puzzle. After all, it is your rear end that will get wet. ◄

Lt. Hills is the squadron LSO, and Lt. Cain is the schedules officer in VA-85. Both completed a deployment with CVW-17 to the Mediterranean Sea aboard USS *Saratoga* (CV-60).

USO Show

By Cdr. Larry W. Nelms

IT was a great morning, as most were in the Indian Ocean after 60 straight days on Gonzo Station. Gosh, how could one complain? The weather was hot but clear, visibility about 10 miles plus a nice breeze. Just think — people pay good money to vacation in a climate like this. My folks back in the Midwest were freezing.

I had a typical but very important flight scheduled that day. My mission: take the USO show from the USS *Carrier* to a couple of small-boys 50 miles away. Anyone could do that. Why plan? Just load 'em up and get the show on the road. Of course, we moved some of the ASW equipment out of the way. Large speakers and sound equipment were certainly more important than ASW that day. Did I need extra fuel? Heck, it was a scheduled, typical, short, humdrum mission. I thought.

We conducted a very typical Indian Ocean brief for a passenger transfer. I thought we looked at all the right things: pax load out, amount of equipment and weight, ship locations, small deck considerations (we were going to be required to hoist the equipment and personnel because of the small deck), and weight and balance. It was an OK mission brief but nothing extraordinary. We also briefed fuel loadout, primarily due to gross weight constraints. The ships were briefed to be only 50 miles away, so fuel didn't seem to be a problem. Of course, we could always HIFR* if fuel got tight. No sweat. It wasn't even EMCON. All the ships were up and talking.

We strapped into our trusty war machine and off we went. We followed the vectors provided by USS *Carrier*, not really paying much attention. The visibility was great, so we only needed to be within a few miles to spot our destination. We could even talk to them. Lo and behold, when we got to where they were supposed to be, they weren't there. Didn't the ships listen to our brief and know where they were supposed to be? We began a search of the area. After about 30 to 45 minutes, we finally found the lost ships. They do get lost so easily.

We completed the required transfers of men, music and sound machines. Mission complete, almost. It had taken a little longer than anticipated to find the ships and the transfer of the USO folks and equipment ran overtime. Therefore, we had used more fuel than planned. But no problem, we would HIFR off the FF in company. Besides the carrier couldn't be that far away. We set up for the HIFR and meanwhile attempted to contact the carrier or E-2 for accurate vectors to get home. But no luck. We must have been too low. I thought. Once we had the fuel, we would climb to altitude and give them a call. I thought I could make it back with no problem, but a couple hundred extra pounds of fuel would give us a nice cushion. We plugged in for the HIFR. Guess what? No fuel. I wondered what was wrong. I went through several pro-

*Helicopter In-flight Refueling

cedures including having the ship increase pressure. No luck again. I contacted the ship for better vectors to mother and asked if they knew of any other ships in the area that could give us some fuel. Things were not going like they were supposed to on this mission. After 15 minutes without receiving fuel, I began to really get concerned. The ship I tried to HIFR from was able to contact the E-2 and carrier and relay a vector. Bad news. The carrier was 65 plus miles away and opening. That's not too bad if you cruise at 300 knots, but the H-3 isn't quite that fast. Given my deteriorating fuel, the situation looked grim.

I had backed myself into a corner. The option I choose was to declare an emergency and land on the deck of the FF. The flight deck on the FF is great for the smaller helicopters but not certified for the H-3. I had the copilot get out the non-aviation ship resume and compare deck size with helo size. I decided we would fit by about 2 feet. I gingerly placed the H-3 on the deck. To my delight, we fit. Fuel was on the way. After the gas, we lifted and returned without incident to the USS *Carrier.*

This mission taught me a valuable lesson about mission planning. I let a very routine, "typical" flight almost turn into a disaster. I could have lost the aircraft due to fuel starvation. First, I should have received better vectors, and second, my mission planning should have been better throughout. I had had a false sense of security. It was day, VMC and no flight restrictions. My mistake was that I treated this like a typical mission. There are no typical missions.

Cdr. Nelms is an H-3 pilot with HS-2.

Are You Ready To Be On-Scene Commander?

By LCdr. Scott A. Beaton

A KC-130 was on station at FL210 for an afternoon tanker mission 50 nm east of Butterworth Air Base in Malaysia. The crew of the KC-130, whose call sign was Plaid 21, topped off Checker 01, an A-4E. The refueling had gone smoothly in a small clear area surrounded by thunderstorms, which are standard during the monsoon season in the afternoon. Two minutes after the A-4 departed, Plaid 21 received a call from Cdr. Gary Weller, the Skyhawk pilot.

"I've got a 20 percent low oil light and would like you to follow me to Butterworth to divert."

The A-4 then quickly descended beneath the thunderstorms that were in all quadrants. Four minutes later, Checker 01 called, "I've got smoke and fumes in the cockpit and a

chugging engine. It looks like I'm going to have to jump out." Due to the clouds, altitude separation and distance between the two aircraft, Plaid 21 had lost sight of the A-4. Maj. Paul Chase, the pilot in command of the tanker, called Cdr. Weller for a TACAN posit.

Since the KC-130 crew could not see the ejection and would have to descend IFR, they stayed at FL210 for several minutes to ensure they would not inadvertently fly into Cdr. Weller's chute or his Skyhawk. After descending through the clouds, Maj. Chase found a clear area in a valley but had to remain less than 1,000 feet AGL to stay clear of the clouds and avoid the surrounding mountains. The KC-130 had to make extremely tight turns at low altitude to stay in the valley and clear of clouds because the weather was rapidly deteriorating.

Seventeen minutes after Cdr. Weller's ejection, the tanker made radio contact with him. Cdr. Weller had passed out upon ejection and sustained major injuries when he landed. To keep the commander alert and coherent, Maj. Chase recounted what had happened and asked about his injuries. Cdr. Weller replied, "I can't move anything except my left arm." Cdr. Weller's skyward view was obstructed because his chute was suspended in small saplings 8 to 10 feet above him. Maj. Chase asked for a long count for a UHF/DF cut, then started to make passes in that portion of the valley. After a few passes, Cdr. Waller called, "Mark on top" based on the sound of the tanker's engines. During the ensuing hard turn, the crew sighted the downed pilot's chute.

Forty minutes into the SAR effort, the first Royal Malaysian Air Force helicopter (Chopper 01) checked in, five minutes out. Unfortunately, the helo ran into a wall of thunderstorms and had to run 60 miles south before they could find a hole to cut through and transit back up the valley. Twenty minutes later, there was still no sign of any helos. Cdr. Weller was now fading in and out of consciousness. Also, as the sun began to set, the weather continued to deteriorate. (The storm system was classified as a weather warning less than 30 minutes after Cdr. Weller was finally rescued.)

Finally, another helo, Chopper 55D, reported on scene from the north. The pilot was reluctant to land, however, after hearing about Cdr. Weller's injuries, because he had no medical personnel aboard. Concerned for the commander's safety and the deterioriating weather, MSgt. John Merchant, the navigator, strongly encouraged, then convinced — as perhaps only a Marine Corps master sergeant can—Chopper 55D to land and assist Cdr. Weller. Within 10 minutes, Chopper 01 reported inbound. MSgt. Merchant vectored Chopper 01 in and coordinated the positioning of both helicopters. Five minutes later, Chopper 01's SAR/medical team was on the ground with the injured A-4 pilot.

Because of Cdr. Weller's condition, the SAR team decided to hoist him aboard with a locally manufactured, hoist-capable metal stretcher instead of his D-Ring. This procedure worked perfectly and prevented further injuries. Chopper 01 then took Cdr. Weller to Butterworth.

Meanwhile, Maj. Chase coordinated with Chopper 55D to secure the crash site, and mark the location of the wreckage and the rescue scene for the mishap inspection team and salvage efforts. As darkness fell, the crew of Plaid 21 turned east, negotiated another wall of thunderstorms and returned to base.

During the ejection sequence, Cdr. Weller suffered a separated shoulder, a fractured collarbone and shoulder blade, five fractured ribs, a partially collapsed lung, and was in severe shock. His right arm was also temporarily paralyzed due to major nerve damage in the arm and shoulder. Without Maj. Chase and the crew of Plaid 21, the weather alone would have prevented a successful rescue until the following day. The superior airmanship, cool headwork, determination and superb crew coordination displayed by Plaid 21 were the keys to rescuing Cdr. Weller. BZ! — Ed. ◄

LCdr. Beaton is a TAR, assigned to CVWR-30. He was the VC-885 Program Manager on detachment in Malaysia at the time of this incident. VC-885 is the Reserve Augmentation Unit of VC-5 whose A-4E was the aircraft flown by Cdr. Weller.

Helicopter Air Refueling:

Increased Readiness Through Training

By Lt. Ron Veliz

The time is 2130 local, and the weather is 2,500 scattered, 4,000 solid overcast — just another extra dark night south of Crete, waiting on the tanker. The aircraft fuel gauges are 750 pounds from bingo; we should have gone to maximum conserve earlier. Where is the tanker? Finally, rendezvous and join-up. We're down to bingo fuel, but the tanker is here. The port hose is streamed; all checklist items are reviewed and complete. Five hundred pounds below bingo. We're committed now. Just as we make contact with the hose, the tanker goes sour; and there we are, stranded, 800 pounds below bingo. What went wrong?

That scenario is one example of a helicopter air refueling (HAR) mission that should not have been allowed to proceed. As an air refueling instructor in the H-53 fleet replacement squadron, I have experienced the added mission flexibility that air refueling lends to an H-53's operational capabilities. HAR permits aircraft transit and deployment at nearly unlimited range. However, there's a price: Training is needed, particularly in the unfamiliar area of HAR mission planning.

HM-12 operates the RH-53D, CH-53E and MH-53E; we try to maintain the HAR proficiency of our aviators through a detailed training program. Four major areas are included in our program: publications, aircraft configuration and checkpoint review, mission brief and operational planning.

The left side is preferred due to the decreased prop wash and turbulence from the tanker.

Publications. The Air Refueling Manual (NAVAIR 00-80T-110) is the cornerstone of procedural training. It provides the guidance necessary to conduct HAR safely. In addition to the AR Manual, aircraft NATOPS manuals cover specific requirements, procedures and flight characteristics. The AR Manual, the OPNAV 3710.7 and applicable NATOPS sections serve as an excellent source of required reading.

Checkpoint Review. If your command does not have a comprehensive set of HAR photographs and video cassette tapes, I recommend that you ask the Fleet Imaging Center to cover your next HAR event. Regardless of how well you can describe a KC-130, nothing provides better training in general procedures and checkpoint recognition than video tapes and still photos. A library of HAR video material provides an excellent training reference for aviators prior to HAR qualification, and also acts as a superior refresher for those aviators currently qualified. Photographs also provide a workable platform for discussions during crew and mission briefs.

The Brief. The HAR environment requires a thorough brief. Developing an organizational HAR brief can lend itself to excellent training. The AR Manual provides the foundation of the HAR brief but also permits the addition of other items. A new piece of information, an additional idea or an added responsibility can save a crew and aircraft. Training sessions where each HAR instructor provides items from the mission brief will provide outstanding ideas for a comprehensive HAR brief.

HAR mission brief items used locally include:

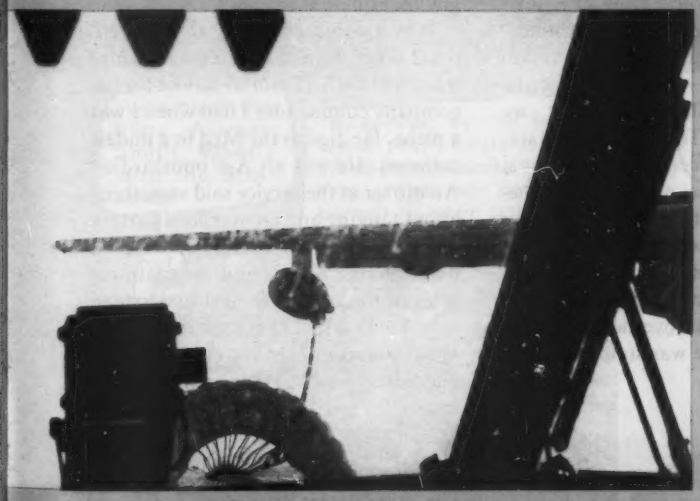
- Air refueling track
- Air refueling control point (ARCP)
- Air refueling control time
- Air refueling altitude, airspeed
- Air refueling abort point
- End air refueling point
- Divert airfields
- Fuel transfer requirements
- ATC clearance limits
- Number of receivers, call signs
- Tanker call sign
- Weather
- Tanker requirements
- Rendezvous frequencies; transponder settings
- Approach control
- Total fuel transferred
- Emergency procedures
- Lost communications

At the stabilized position prior to contact.

Operational Planning. To make the best use of an air-refueled H-53 demands extensive preflight planning. That planning alone can serve as an additional training topic. HAR preflight planning could include the following questions. Given your aircraft gross weight, what is your best refueling altitude for maximum range and maximum endurance? What is your best airspeed? How long can you loiter on two engines? How far along course should the ARCP be, and how much further along track should the bingo point be? Proper mission planning is the best defense against the scenario described at the beginning of this article.

Lt. Veliz is the squadron CH-53E/MH-53E NATOPS officer for HM-12. He is the MH-53 model manager for the squadron and air refueling instructor.

En route to the refueling position. The pilot then drives the basket forward, outboard and up.



At the refueling position, the H-53 is established in the refueling position and receiving fuel.

What About You?

By LCdr. Jim Butler

THERE is no way the symphony of flight-deck launches and recoveries would work if every man on the ship and every crew were not trying as hard as possible to do it right — every time. However, we also know our profession is not the safest in the world. Accidents happen. It is distressing, but not really surprising, that we lose aircraft, people and equipment at about the same rate every year. That does not stop us; we all go on.

We tend to rely on our own talents and abilities to see us through. We have to be confident, and we are. If we know our procedures and do them correctly, flying on and off the ship can be done safely. Equipment failure? Sure, things break, but there are procedures to cover almost any emergency. We can live with that. What about people failure? Failing to follow established procedures often carries a deadly penalty. Sometimes, there are no established procedures for bailing out of a bad situation caused by human error.

I was in my trusty A-6 tanker, at night, in the overhead pattern at 10,000 feet, tanking a thirsty Tomcat. Everything was going fine. He plugged in, received 2,000 pounds of fuel, unplugged and came up our right side. I stowed the basket and kissed him off with a few flashes of my flashlight, and off he went into the night. I watched the F-14 until he seemed well clear and continuing to open the distance between us. I then turned my attention back into the cockpit, took a scan of the instrument panel and began writing the Tomcat's side number and the amount of fuel we passed him. Suddenly, the hair on my neck started rising as my peripheral vision sent a message to my brain: "It's rapidly getting bright outside your window, and I don't think it's the moon." I didn't like what I saw: one F-14, left wing down, co-altitude and getting bigger and BIGGER. Something about constant bearing, decreasing range flashed through my mind, but there was not time to take any bearings. I'm glad I had my vox turned on because all I had time to do was yell "Climb! Climb! Climb!" to my pilot. He knew from IFR low-level flying that if he ever heard "Climb!" from the bombardier, he wasn't supposed to ask why — he just pulled on the stick. As we pulled into buffet, we barely cleared the Tomcat's vertical stabilizers as he sliced underneath us. Someone in our cockpit muttered something like "I just love night tanker hops!" I called the F-14 on departure frequency but got no answer, and I watched in amazement as he lazily continued through the overhead circle at 10,000 feet as if he was supposed to be there.

Before anyone thinks I blame this incident totally on the Tomcat crew, I don't. They obviously did not continue outbound past 10 miles and then climb. But we in the A-6 did not follow correct procedures either. Instead of signaling the F-14 to exit the tanker pattern by flashing a flashlight, we should have backed it up by turning on our anti-collision light. That would have given the Tomcat crew a better chance of seeing us.

I had a skipper once who used to tell us he loved to fly around the ship but did so "half scared." I've never heard it put any better. We need to enjoy ourselves, but we need to have the deepest respect for following proper procedures, and then always be on the watch for the guy that doesn't.

Why did this incident grab my attention? When I was a first class midshipman, we held a memorial service for the company commander I had when I was a plebe. He died in the Med in a midair collision. He was an A-6 bombardier. An officer at the service said something about tanking and an overhead pattern above the ship, but I barely understood maneuvering boards and international rules of the road. I think I understand now. I'm thankful I got a second chance. What about you? Do you cut corners, or maybe rely now and then on the "big sky theory"? ◄

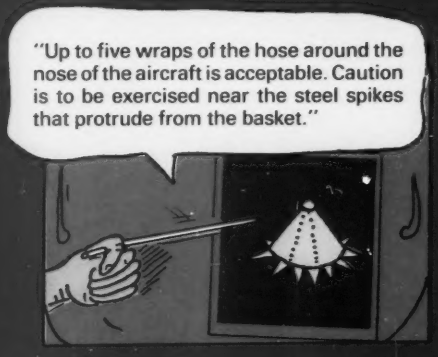
LCdr. Butler is an A-6 B/N. He has accumulated over 2,400 hours in the A-6 Intruder and is currently the assistant maintenance officer with the Green Lizards of VA-95.

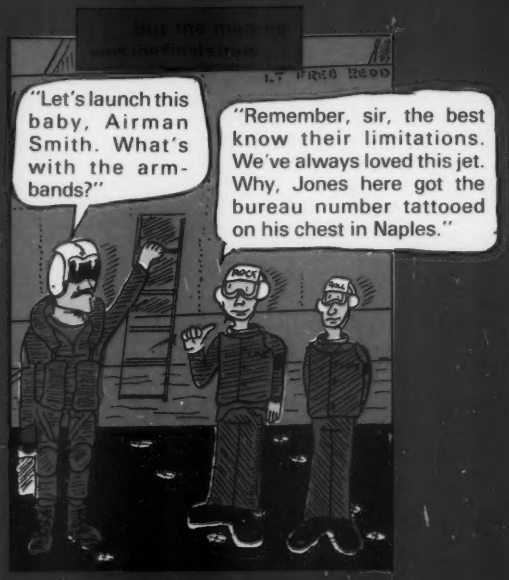
BROWNSHOES IN ACTION COMIX

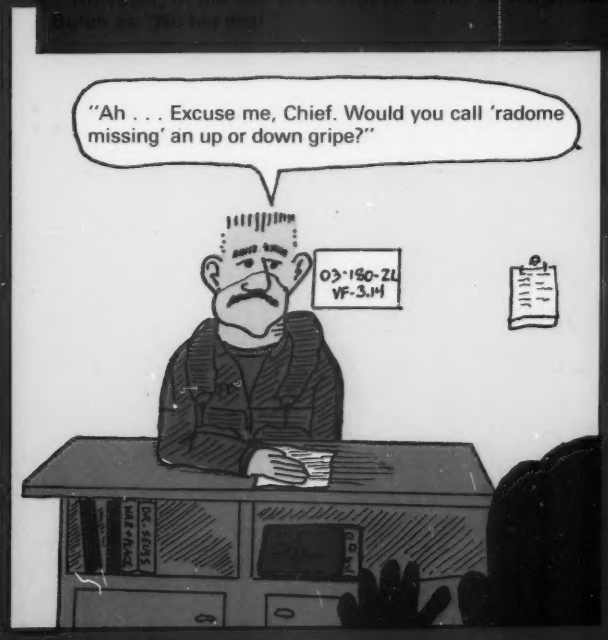
"THE KIND REAL AVIATORS LIKE"

It was to the tanker pattern at the RAG that young "Butch" Susco heard of the horrors . . .

The pivic brief made it sound so easy . . .







"I consider this possible as a stunt, but as a service routine job, distinctly improbable"

RAF Pilot circa 1932